What is Claimed:

1. A method of converting an interlace scan video image to a progressive scan video image, comprising the steps of:

(a) determining whether a target picture element (pixel) position of an interpolated row of pixels lies on an edge between visually distinct regions;

(b) determining a degree of movement in the region of the target pixel position between a previously displayed image and the interlace scan image;

(c) generating a plurality of potential values for an interpolated pixel at the target pixel position; and

(d) selecting at least one potential value from the plurality of potential values for the interpolated pixel responsive to the determination of whether said target pixel position lies on an edge and the determined degree of movement in the region of the target pixel position.

2. A method according to claim 1 wherein

step (c) includes the steps of:

generating an edge interpolation value;

generating an inter-field interpolation value; and

generating an intra-field interpolation value; and

step (d) includes the step of selecting the edge interpolation value responsive to the determination that the target pixel position lies on an edge

3. A method according to claim 2, wherein:

step (a) includes the steps of:

generating a vertical edge strength value for the target pixel position;

generating a horizontal edge strength value for the target pixel position;

comparing the vertical edge strength value and the horizontal edge strength value to a threshold value; and

determining that the target pixel position lies on an edge if at least one of the horizontal edge strength value and the vertical edge strength value exceeds a predetermined threshold value; and

the step of generating an edge interpolation value includes the steps of:

determining an angle of the edge responsive to the vertical edge strength value and the horizontal edge strength value; and

generating the edge interpolation value responsive to pixels in the interlace scan image that lie along the determined angle.

4. A method according to claim 2 in which step (d) includes the steps of:

selecting the intra-field interpolation value and the inter-field interpolation value; and

blending the intra-field interpolation value and the inter-field interpolation value according to the degree of movement determined in step (b) to generate the value for the interpolated pixel.

5. A method according to claim 4, wherein the step of generating an inter-field interpolation value includes the step of generating a field-merge interpolation value.

6. A method according to claim 4, wherein the step of generating an inter-field interpolation value includes the step of generating a non-linear interpolation value.

7. A method according to claim 1, wherein the step of determining a degree of movement in the region of the target pixel position between a previously displayed image and the interlace scan image includes the steps of:

selecting a plurality of corresponding pixel positions in the region of the interlace scan image and in a corresponding region of the previously displayed image;

generating a respective plurality difference values, each representing a difference between one of the selected pixel positions in the interlace scan image and the respective corresponding pixel position in the previously displayed image;

determining a maximum difference value of the plurality of difference values; and

comparing the maximum difference value to multiple respectively different threshold values to determine the degree of movement in the region of the target pixel position.

8. A method according to claim 1, further including the step of filtering the interpolated pixel value to reduce errors in the interpolated pixel resulting from electrical noise in the interlace scan video image.

9. A method according to claim 8, wherein the step of filtering the interpolated pixel includes the steps of:

if the target pixel position is determined to lie on an edge between visually distinct regions, comparing the interpolated pixel and other pixels in the interlace scan image to a plurality of edge masks to generate a respective plurality of correlation values; and

if none of the plurality of correlation values exceeds a predetermined threshold value, calculating a new value for the interpolated pixel.

10. A method according to claim 9, wherein:

step (c) includes the steps of:

generating an edge interpolation value;

generating a non-linear interpolation value; and

generating an inter-field interpolation value; and

the step of calculating a new value for the interpolated pixel includes the step of blending the intra-field interpolation value and the inter-field interpolation value according to the degree of movement determined in step (b) to generate the new value for the interpolated pixel.

11. A method according to claim 10, wherein the step of generating an inter-field interpolation value includes the step of generating a field-merge interpolation value.

12. A method according to claim 10, wherein the step of generating an inter-field interpolation value includes the step of generating a non-linear interpolation value.

13. A method of converting an interlace scan video image which exhibits frame-to-frame motion to a progressive scan video image, comprising the steps of:

determining a degree of movement in a region of a target picture element (pixel) position between a last displayed image and a current image;

generating an intra-field interpolated pixel value for the target pixel position;

generating an inter-field interpolated pixel value for the target pixel position; and

combining the intra-field interpolated pixel value and the inter-field interpolated pixel value in a proportion determined by the degree of movement in the region to produce an output interpolated pixel value for the progressive scan video image.

14. A method according to claim 13, wherein the step of determining a degree of movement in the region of the target pixel position between the last displayed image and the current image includes the steps of:

selecting a plurality of corresponding pixel positions in the region of the current image and in a corresponding region of the last displayed image;

generating a respective plurality difference values, each representing a difference between one of the selected pixel positions in the current image and the respective corresponding pixel position in the last displayed image;

determining a maximum difference value of the plurality of difference values; and

comparing the maximum difference value to multiple respectively different threshold values to determine the degree of movement in the region of the target pixel position.

15. A method according to claim 14, wherein the step of generating an inter-field interpolation value includes the step of generating a field-merge interpolation value.

16. A method according to claim 14, wherein the step of generating an inter-field interpolation value includes the step of generating a non-linear interpolation value.

17. A method according to claim 16, wherein the step of generating the non-linear interpolated pixel value includes the steps of:

determining respective minimum, maximum and median values for respective sets of pixel values, each set of pixel values including respective pixel values for pixel positions vertically adjacent to the target pixel position in the interlace scan image and the sets including respective pixel positions from a previous frame that include the target pixel position and pixel positions horizontally adjacent to the target pixel position;

determining respective difference values between the maximum and minimum values for each set of pixel values; and

selecting, as the non-linear interpolated value, the median value from the set having the difference value that is less than any other one of the difference values.

18. A method of generating a non-linear interpolated pixel value for a target picture element (pixel) position between successive lines of an interlace scan video image, the video image including a plurality of successive fields, each pair of fields defining an image frame, the method including the steps of:

determining respective minimum, maximum and median values for respective sets of pixel values, each set of pixel values including respective pixel values for pixel positions vertically adjacent to the target pixel position in the interlace scan image and the sets including respective pixel positions from a previous frame that include the target pixel position and pixel positions horizontally adjacent to the target pixel position;

determining respective difference values between the maximum and minimum values for each set of pixel values; and

selecting, as the non-linear interpolated value, the median value from the set having the difference value that is less than any other one of the difference values.

19. An interlace scan to progressive scan video signal conversion system, comprising:

an edge detector that determines whether a target picture element (pixel) position of an interpolated row of pixels lies on an edge between visually distinct regions of a current image defined by the interlace scan video signal to provide an edge flag;

a motion detector that determines a degree of movement in a further region of the current image containing the target pixel position between a previously displayed image and a current image to provide a static level value;

a plurality of pixel interpolators which generate a plurality of potential values for an interpolated pixel at the target pixel position, each potential value being generated by a respectively different method; and

a selector which selects at least one potential value from the plurality of potential values for the interpolated pixel responsive to the edge flag and the static level value.

20. A system according to claim 19 wherein the plurality of pixel interpolators include:

an edge interpolator;

a inter-field interpolator; and

an intra-field interpolator.

21. A system according to claim 20, wherein the inter-field interpolator is selected from a group consisting of a field merge interpolator and a non-linear interpolator.

22. A method according to claim 20, wherein:

the edge detector includes:

a vertical filter which generates a vertical edge strength value for the target pixel position;

a horizontal filter which generates a horizontal edge strength value for the target pixel position;

a comparator which compares the vertical edge strength value and the horizontal edge strength value to a threshold value and provides the edge flag if at least one of the horizontal edge strength value and the vertical edge strength value exceeds a predetermined threshold value; and

the edge interpolator includes:

a processor which combines the vertical edge strength value and the horizontal edge strength value to determine an angle of the edge; and

an interpolator which processes pixel values from the interlaced field that lies on a line having an angle with respect to the target pixel position that conforms to the determined angle of the edge to generate the interpolated pixel value.

23. An interlace scan to progressive scan video signal conversion system according to claim 19, wherein the motion detector includes:

a plurality of subtractors for generating a respective plurality difference values, each representing a difference between a selected pixel position in the current image and a respective corresponding pixel position in the previously displayed image;

a maximum comparator which determines a maximum difference value of the plurality of difference values; and

a plurality of further comparators which compare the maximum difference value to respectively different threshold values to determine the degree of movement in the region of the target pixel position wherein the static level value is provided responsive to the further comparators that have respective threshold values which are less than the maximum difference value.

24. A system according to claim 23, wherein the selector selects the intra-field interpolation value and the inter-field interpolation value and further includes a weighted averaging circuit which blends the intra-field interpolation value and the inter-field interpolation value in proportion to the static level value to generate the value for the interpolated pixel.

25. A system according to claim 19, further including a filter which processes the interpolated pixel value to reduce errors in the interpolated pixel resulting from electrical noise in the interlace scan video image.

26. A system according to claim 25, wherein the filter includes:

a plurality of correlators, each correlator comparing the interpolated pixel and other pixels in the interlace scan image to a respective edge mask to generate a respective plurality of correlation values;

a comparator which compares each of the plurality of correlation values to a predetermined threshold value to sets a valid edge flag if at least one of the correlation values exceeds the predetermined threshold value; and

a further interpolator which calculates a new value for the interpolated pixel if the valid edge flag is not set.

27. A method according to claim 26, wherein:

the plurality of pixel interpolators include:

an edge interpolator which produces an edge interpolated value;

an inter-field interpolator which produces an inter-field interpolated value; and

an intra-field interpolator which produces an intra-field interpolation value; and

the further interpolator includes a weighted averaging circuit that combines the intra-field interpolation value and the inter-field interpolation value in proportion to the static level value to generate the new value for the interpolated pixel.

28. An interlace scan to progressive scan video signal conversion system, comprising:

a motion detector which determines a degree of movement in a region of a target pixel position between a last displayed image and a current image to generate a static level value;

an intra-field interpolator which generates an intra-field interpolated pixel value;

a non-linear interpolator which generates an non-linear interpolated pixel value; and

a weighted averaging circuit that combines the intra-field interpolated pixel value and the non-linear interpolated pixel value in proportion to the static level value to produce an output interpolated pixel value for the progressive scan video image.

29. An interlace scan to progressive scan video signal conversion system according to claim 28, wherein the motion detector includes:

a plurality of subtractors for generating a respective plurality difference values, each representing a difference between a selected pixel position in the current image and a respective corresponding pixel position in the last displayed image;

a maximum comparator which determines a maximum difference value of the plurality of difference values; and

a plurality of further comparators which compare the maximum difference value to respectively different threshold values to determine the degree of movement in the region of the target pixel position wherein the static level value is provided responsive to the further comparators that have respective threshold values which are less than the maximum difference value.

30. A system according to claim 29, wherein the non-linear interpolator includes:

a plurality of median filters, each filter determining respective minimum, maximum and median values for respective sets of pixel values, each set of pixel values including respective pixel values for pixel positions vertically adjacent to the target pixel position in the interlace scan image and the sets including respective pixel positions from a previous frame that include the target pixel position and pixel positions horizontally adjacent to the target pixel position;

a plurality of subtractors which determine respective difference values between the maximum and minimum values for each set of pixel values provided by the respective plurality of median filters; and

a multiplexer that selects, as the non-linear interpolated value, the median value corresponding to the difference value that is less than any other one of the difference values.

31. A non-linear interpolator for converting an interlace-scan image to a progressive scan image, the interlace scan image including a plurality of successive fields wherein each pair of fields defines a frame, the non-linear

interpolator generating an interpolated pixel value for a target pixel position, the target pixel position being vertically aligned between two pixel positions of the interlace scan image, the nonlinear interpolator comprising:

a plurality of median filters, each filter determining respective minimum, maximum and median values for respective sets of pixel values, each set of pixel values including respective pixel values for pixel positions vertically adjacent to the target pixel position in the interlace scan image and the sets including respective pixel positions from a previous frame that include the target pixel position and pixel positions horizontally adjacent to the target pixel position;

a plurality of subtractors which determine respective difference values between the maximum and minimum values for each set of pixel values provided by the respective plurality of median filters; and

a multiplexer that selects, as the non-linear interpolated value, the median value corresponding to the difference value that is less than any other one of the difference values.